

Connecticut Department of Public Health

# Visual Impairment in Connecticut

## Results from the 2000 Behavioral Risk Factor Surveillance System



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John G. Rowland, Governor  
Joxel Garcia, M.D., M.B.A., Commissioner

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# Connecticut Department of Public Health

Bureau of Community Health  
Ardell A. Wilson, D.D.S., M.P.H.  
Bureau Chief

Report Prepared by  
Mary Adams  
Epidemiologist

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## Vision Data from the 2000 BRFSS

### Executive Summary

In 2000, the Connecticut Department of Public Health collected data about vision exams and self-reported vision on a telephone survey of 3,915 non-institutionalized, randomly selected adults in the state. Questions were adapted from other surveys, and included three questions addressing respondents' distant, mid-range and close-up vision, "with glasses or contacts if you usually wear them". A previously validated formula was used to translate responses to these questions into an estimate of actual visual acuity. For the purpose of this report, "low vision" was defined as a visual acuity less than 36, which corresponds to about 20/40 vision.

#### Key Findings:

- One in every nine adults (11.0%) had "low vision", with similar rates for men and women.
- Rates ranged from 5.2% for 18-24 year olds, to 16.3% for those aged 65 and older, with a relatively abrupt increase between 35-44 year olds (8.3%) and 45-54 year olds (14.5%).
- Rates of low vision were especially high for Hispanics (31.7%) and Blacks (15.5%) compared with non-Hispanic whites (8.0%).
- Adults in low-income households and those living in urban areas were also more likely to report low vision.
- Overall, 4.4% of Connecticut adults never had a vision exam that included checking for health problems such as glaucoma; 24% of Hispanics never had such an exam.
- Vision status was highly associated with having an eye exam. Among adults who never had an eye exam, 41% reported low vision.
- Compared with persons without diabetes, persons with diabetes were twice as likely to report low vision (22.6% vs. 10.3%).
- Adults with low vision were more likely to report being out of work and having an activity limitation.
- Six persons (0.2%) reported they were completely blind.

Results suggest the need to assure that low-income and Hispanic adults receive vision exams and proper follow up. The results also indicate the need to provide written health materials in large print.

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## Introduction

Low vision is a health problem that can affect many aspects of people's lives. Our ability to see influences the way we learn, communicate, navigate, and earn our livelihood. Low vision is neither precisely defined, like high blood pressure or obesity, nor easy to categorize, which makes standardized measurement difficult. Legal blindness (20/200 or worse vision in the better eye or visual acuity  $<6$ ), is a special category of low vision which is frequently used to identify persons that qualify for special services. Many people with vision problems, including some of those who are legally blind, can be helped if the problem is identified during an eye examination. Those that can't be helped with glasses, contact lenses, medicine, or surgery, can often benefit by various aids, including magnifiers or large-print books, that can vastly improve their quality of life.

The ability to estimate the prevalence of low vision is necessary to target interventions that might improve the quality of life for people whose vision is poor. In particular, the Connecticut Board of Education and Services for the Blind (BESB) needs estimates of the number of legally blind persons in the state that qualify for their services. In order to estimate the prevalence of visual impairment, the Connecticut Behavioral Risk Factor Surveillance Survey (BRFSS) included several questions in 2000 that addressed vision and eye exams. This report summarizes those results for the 3,915 non-institutionalized adults, aged 18 and older, that were surveyed that year.

## Methods

The Behavioral Risk Factor Surveillance Survey (BRFSS) collects data from non-institutionalized adults, aged 18 and older, through monthly random digit dialed telephone surveys. The survey is coordinated and partially funded by the Centers for Disease Control and Prevention (CDC) and is conducted in all 50 states. During 2000, with the collaboration and financial support of BESB, the Connecticut survey included questions that addressed vision (See Appendix A, pages 19-23). Bilingual interviewers conducted about 5% of all surveys in Spanish. Raw data from the 3,915 surveys conducted in 2000 were adjusted to be representative of the Connecticut adult population by age and gender.

Prevalence estimates were determined with PC SAS, version 6.04. SAS produces accurate point estimates (as reported here), but does not calculate margins of error, since it does not account for the complex sample design of the BRFSS. The margin of error was estimated by other means and was less than plus or minus 2 for the total sample of 3,915, with larger errors for smaller sample sizes. The margin of error for results for Blacks or Hispanics was about  $\pm 6$ . Respondents with missing values were excluded from analysis of that variable unless otherwise noted. With the exception of overweight and income measures, this usually had little or no effect on the results.

Data were analyzed by community type as defined by the State Department of Education's (SDEs) Educational Reference Group (ERG). This measure combines seven income, education, and demographic characteristics into a single category relating to socioeconomic status (SES). ERG was selected as a convenient way to look at BRFSS data at a sub-state level, combining towns with similar SES, even though they might be in different parts of the state. Earlier studies of Connecticut BRFSS data<sup>1</sup> showed that risk factor prevalence rates

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were related to the household income and educational attainment of the respondent, so it was felt ERGs would be a useful grouping. The SDE has assigned all 169 towns and school districts into one of nine levels of ERG, as listed in Table 1, with ERG A representing the highest level of income and education.

**TABLE 1**  
**CONNECTICUT EDUCATIONAL REFERENCE GROUPS (ERGs), 1996**  
**(From highest to lowest income/education)**

ERG = A			
Avon	New Canaan	Simsbury	Wilton
Darien	Redding	Weston	Woodbridge
Easton	Ridgefield	Westport	
ERG = B			
Bethel	Glastonbury	Marlborough	South Windsor
Brookfield	Granby	Monroe	Trumbull
Cheshire	Greenwich	New Fairfield	West Hartford
Fairfield	Guilford	Newtown	
Farmington	Madison	Orange	
ERG = C			
Andover	East Granby	Mansfield	Sherman
Barkhamsted	Ellington	Middlebury	Somers
Bethany	Essex	Middlefield	Southbury
Bethlehem	Goshen	Morris	Suffield
Bolton	Haddam	New Hartford	Warren
Bozrah	Harwinton	Old Lyme	Westbrook
Burlington	Hebron	Oxford	Willington
Canton	Killingworth	Pomfret	Woodbury
Cornwall	Ledyard	Preston	Woodstock
Deep River	Litchfield	Salem	
Durham	Lyme	Salisbury	
ERG = D			
Berlin	Cromwell	N.Branford	Southington
Branford	East Hampton	North Haven	Tolland
Bridgewater	East Lyme	Old Saybrook	Washington
Clinton	Hamden	Rocky Hill	Watertown
Colchester	Newington	Roxbury	Wethersfield
Columbia	New Milford	Shelton	Windsor

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**Table 1 Continued**

ERG = E

Ashford	Colebrook	Hartland	Portland
Beacon Falls	Coventry	Kent	Prospect
Brooklyn	Eastford	Lebanon	Scotland
Canaan	East Haddam	Lisbon	Sharon
Canterbury	Franklin	Norfolk	Union
Chester	Hampton	N. Stonington	

ERG = F

Bloomfield	Milford	Stonington	Wallingford
Enfield	Montville	Stratford	Waterford
Groton	Naugatuck	Torrington	Windsor Locks
Manchester	Seymour	Vernon	Wolcott

ERG = G

Chaplin	North Canaan	Sprague	Thompson
East Haven	Plainfield	Stafford	Voluntown
East Windsor	Plainville	Sterling	Winchester
Griswold	Plymouth	Thomaston	

ERG = H

Ansonia	E. Hartford	Middletown	Putnam
Bristol	Killingly	Norwalk	Stamford
Danbury	Meriden	Norwich	West Haven
Derby			

ERG = I

Bridgeport	New Britain	New London	Windham
Hartford	New Haven	Waterbury	

Unlike other risk factors measured on the BRFSS, no standard nomenclature or measure has evolved to define “vision risk.” Two vision measures were created for this analysis, both specifying “with glasses or contact lenses if you usually wear them”. Actual visual acuity was estimated using a formula that translated responses to three of the vision questions (#4 - #6) to the number of letters read on a LogMar chart<sup>2</sup> (see Appendix B for actual formula). Those questions measured distant (ability to recognize objects across the street), mid-range (TV watching), and close-up vision (newspaper). Anyone with a visual acuity of less than 36, which corresponds to about 20/40 vision, was considered to have “**low vision**.” This measure also included the 6 respondents who indicated they were completely blind. When compared with measured acuity among diabetic adults, the method has been shown to have good to excellent validity<sup>2</sup>. There is no reason to suspect that the method wouldn’t be equally valid for non-diabetics (R. Klein, personal communication). “**Poor vision**” was defined as self-reported fair, poor, or very poor vision, or complete blindness (Question #1).

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## Results

### Vision Data

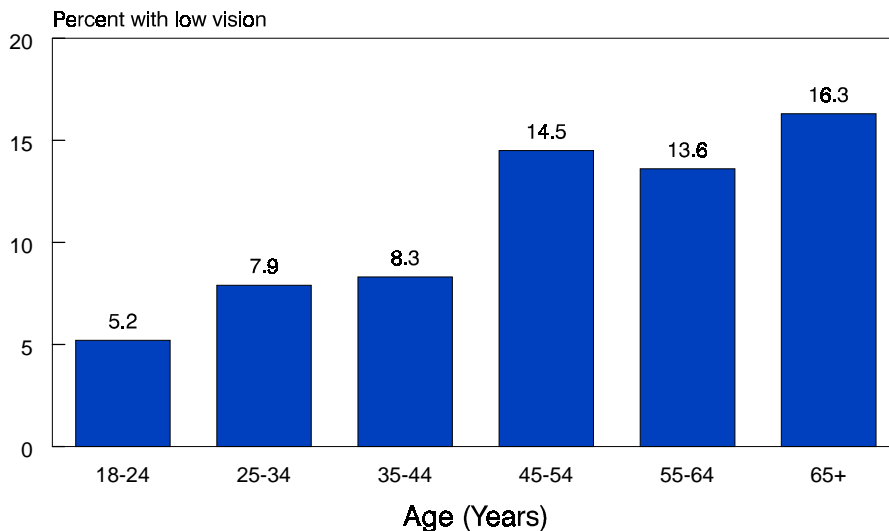
One of every nine adults (11.0%) was estimated to have a visual acuity of less than 36 and was classed as having “low vision.” By the more subjective measure, 15.8% of adults self-reported “poor vision.” In both cases, results were similar for men and women. Figures 1 and 2 show the rates of “low vision” by age and race/ethnicity. Only six persons, (0.2% of all adults), were classed as legally blind, all of whom said they were “completely blind”.

The measure of “low vision” was chosen to illustrate most of the results, since it appeared to better represent the inability to see well. For example, “low vision” was highly associated with whether or not a person had an eye exam, but “poor vision” was not. And while the overall rate of “poor vision” was higher than for “low vision,” the magnitude of differences between sub-groups was usually larger for the more objective acuity estimate. It appeared that the same standard for measuring and self-reporting vision status was not used by all respondents. Some persons may have reported poor vision if they had trouble reading fine print, while others may have reserved this category for more serious vision problems.

Low vision increased with age, with the rate for those aged 65 and over more than three times the rate for those 18-24 (Figure 1). The increase did not appear to be linear, but seemed to have two distinct phases, rising abruptly for the 45-54 year olds. Many of the results are presented separately (stratified) for 18-44 year olds and ages 45 and older, because these two groups seemed to have different rates of low vision. For conditions that were infrequent among younger persons, such as diabetes or health impairments, results are presented for all ages combined.

Figure 1.

Low Vision by Age Group  
Connecticut Adults - 2000 BRFSS

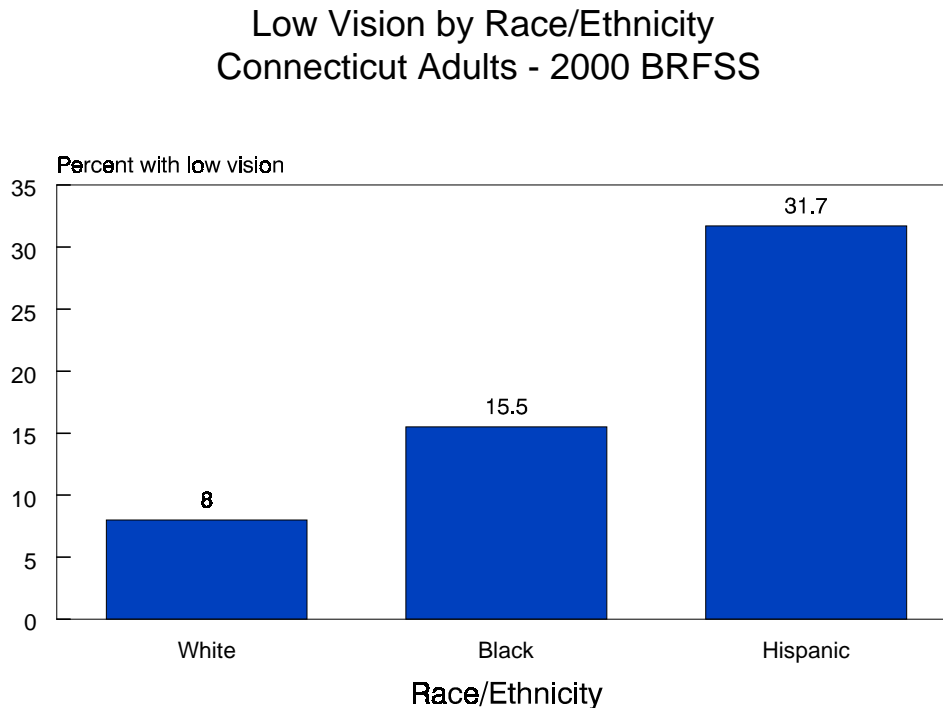


Source: BRFSS, self-reports

Low vision = visual acuity <36 from results of 3 questions, or completely blind



Figure 2.



Source: BRFSS, self-reports

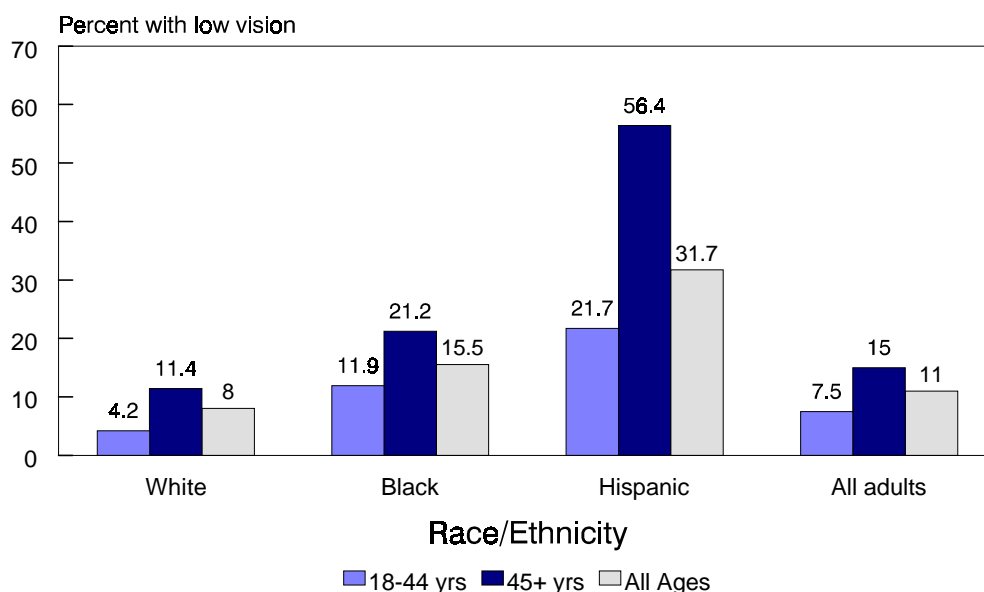
Low vision = visual acuity <36 from results of 3 questions, or completely blind

Rates of low vision also varied greatly by race and ethnicity; rates for Blacks were nearly double (15.5%) and those for Hispanics (31.7%) were about four times greater than rates for non-Hispanic Whites (8.0%). Results for self-reported poor vision were similar, but not as dramatic. In addition, because Hispanics tended to be younger than Whites, the differences were magnified when the data were stratified by age (Figure 3). For example, among Hispanics aged 45 and older, 56% were estimated to have visual acuity less than 36, a rate about five times higher than for non-Hispanic Whites of the same age.

Because the acuity formula included a measure based on “reading print”, it was not clear if poor literacy might be contributing to the large differences noted between racial/ethnic groups. Results for the three separate questions that made up the “low vision” measure were examined separately and showed similar results. Hispanics and Blacks were just about as likely to report trouble seeing across the street and watching TV as they were to report trouble “reading print” in newspapers, etc. Thus it does not appear that low literacy was a factor in the results (Figure 4).

Figure 3.

### Low Vision by Race/Ethnicity and Age Connecticut Adults - 2000 BRFSS

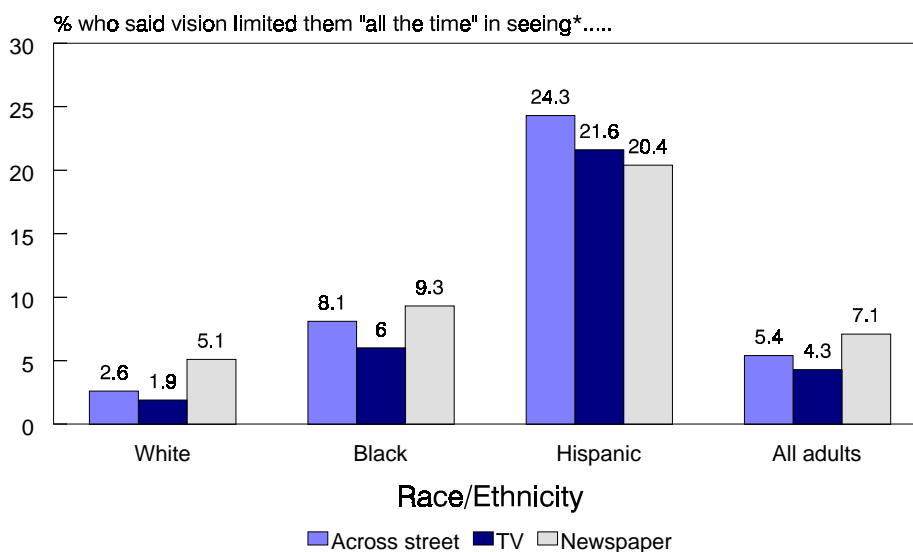


Source: BRFSS, self-reports

Low vision = visual acuity <36 from results of 3 questions, or completely blind

Figure 4.

### Separate Vision Measures by Race/Ethnicity Connecticut Adults - 2000 BRFSS



Source: BRFSS, self-reports

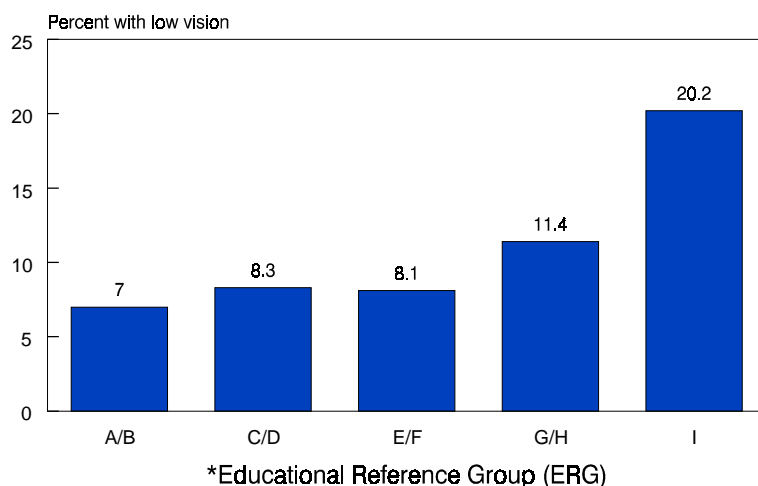
\*With glasses or contacts if you usually wear them....."

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Socioeconomic status, as measured by income level or Educational Reference Group (ERG), was clearly associated with low vision (Figures 5 & 6). On the other hand, health insurance status (which is not included in the ERG measure) was not associated with vision (not shown).

Figure 5.

### Low Vision by ERG\* Connecticut Adults - 2000 BRFSS

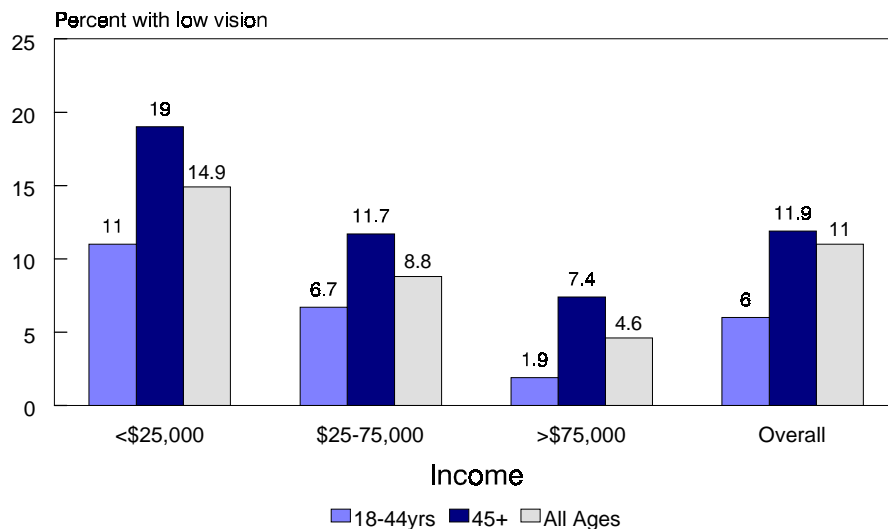


Source: BRFSS, self-reports

Low vision = visual acuity <36 from results of 3 questions, or completely blind

Figure 6.

### Low Vision by Income and Age Connecticut Adults - 2000 BRFSS



Source: BRFSS, self-reports

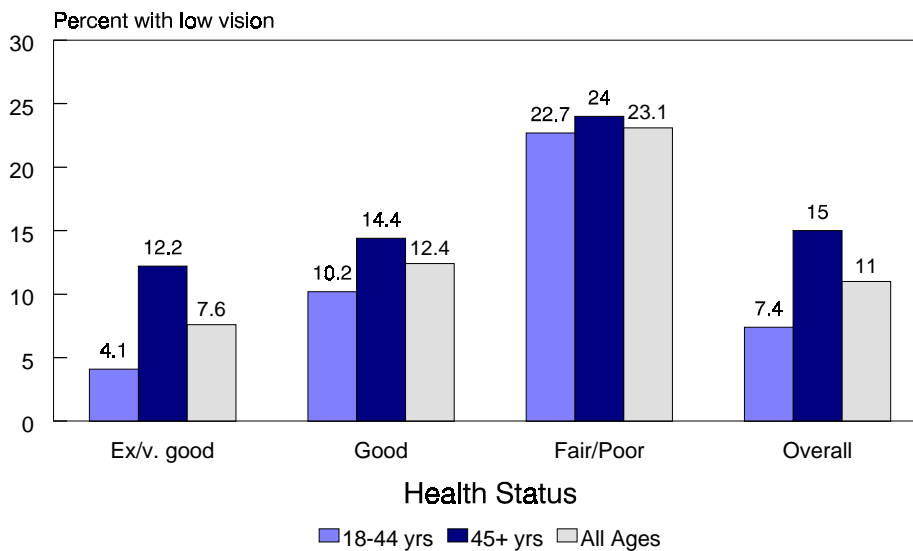
Low vision = visual acuity <36 from results of 3 questions, or completely blind

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Prevalence of low vision and poor vision were compared with general health status, disease rates, and various risk factors. Self-reported general health status appeared to be associated with vision, as shown in Figure 7. The only group with a prevalence of low vision less than 5%, was 18-44 year old respondents who reported excellent or very good health. No association was noted between vision and current smoking, engaging in regular, moderate exercise (5 days a week, 30 minutes each), or eating five or more servings of fruits and vegetables each day. Compared with persons without diabetes, persons with diabetes were about twice as likely to report low vision (Figure 8). In addition, compared to those without the risk factors, overweight and obese persons and those not engaging in any exercise, were more likely to report low vision (Figures 9 & 10). A summary of key results for demographics and risk factors is shown in Appendix C.

Figure 7.

### Low Vision by General Health and Age Connecticut Adults - 2000 BRFSS

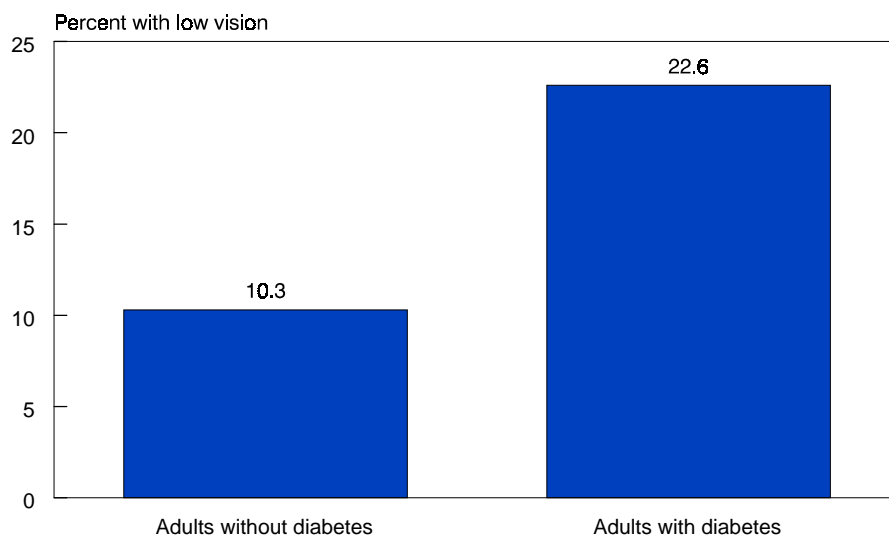


Source: BRFSS, self-reports

Low vision = visual acuity <36 from results of 3 questions, or completely blind

Figure 8.

Low Vision and Diabetes  
Connecticut Adults - 2000 BRFSS

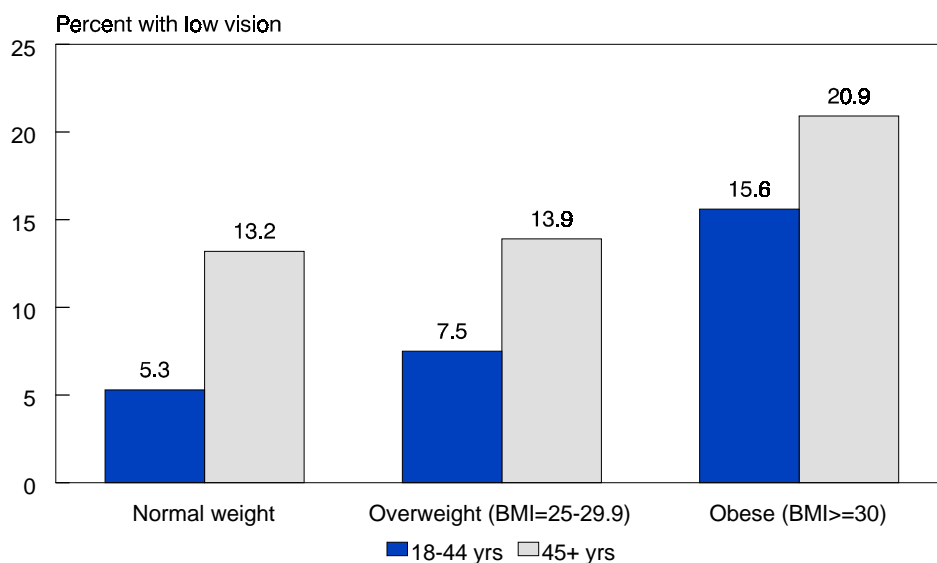


Source: BRFSS, self-reports

Low vision = visual acuity <36 from results of 3 questions, or completely blind

Figure 9.

Low Vision by Overweight and Obesity  
Connecticut Adults - 2000 BRFSS

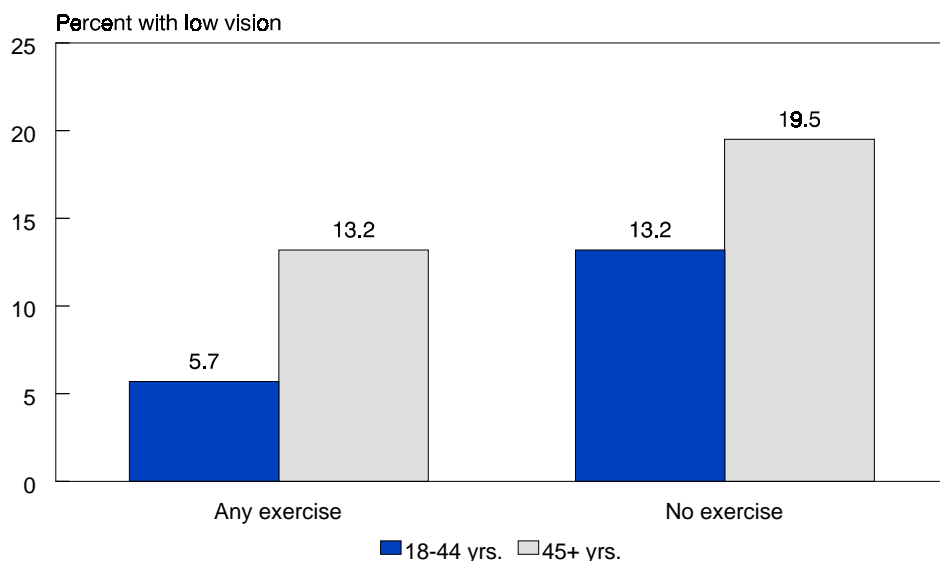


Source: BRFSS, self-reports

Low vision = visual acuity <36 from results of 3 questions, or completely blind

Figure 10.

Low Vision by Leisure Time Exercise  
Connecticut Adults - 2000 BRFSS



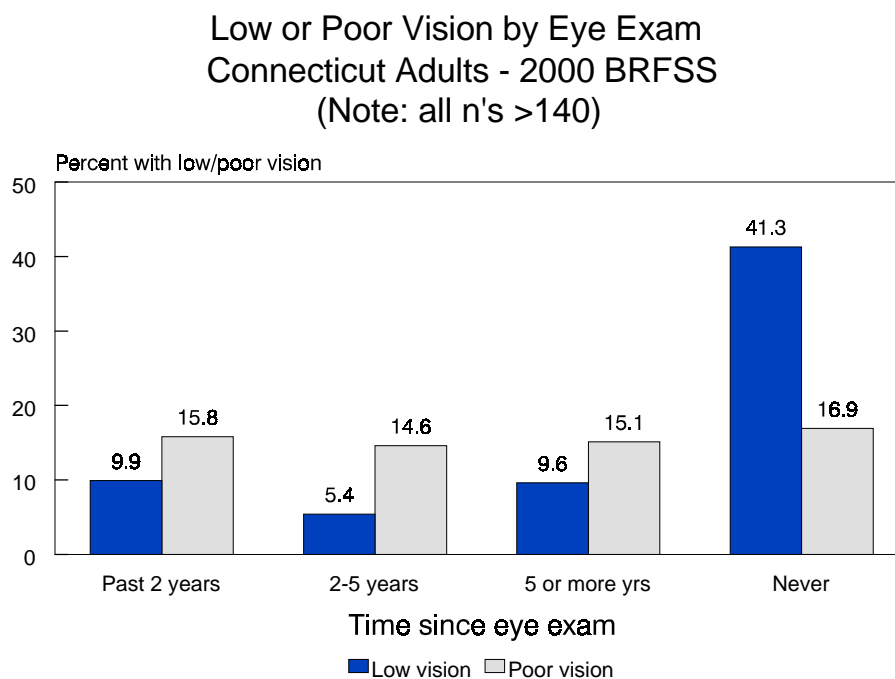
Source: BRFSS, self-reports

Low vision = visual acuity <36 from results of 3 questions, or completely blind

### Eye Exams

At some point in their lives, most respondents have had an eye exam that included a vision screening and checking for health problems such as glaucoma, yet 142, or 4.4% had not. Eighty percent of those who never had an eye exam had had a routine physical check-up within the past two years. As noted earlier, not having an eye exam was highly correlated with low vision, but not with self-rated poor vision (Figure 11); 41% of those who never had an eye exam had low vision while only 16.9% reported poor vision. Blind persons were not asked this question.

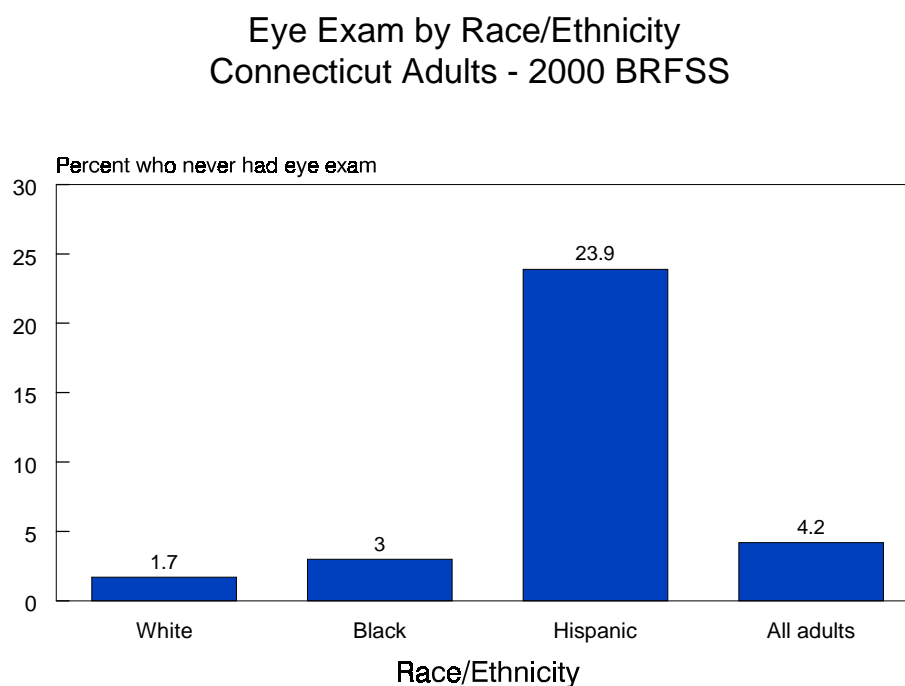
Figure 11.



Source: BRFSS, self-reported poor vision  
Low vision = visual acuity <36 from results of 3 questions

Over half of all persons who never had an eye exam were Hispanic, representing nearly one fourth of Hispanics (Figure 12). Most persons who never had an eye exam reported they had health insurance, although it might not cover eye exams.

Figure 12.



Source: BRFSS, self-reports; Eye exam includes vision screening and checking for health problems such as glaucoma.

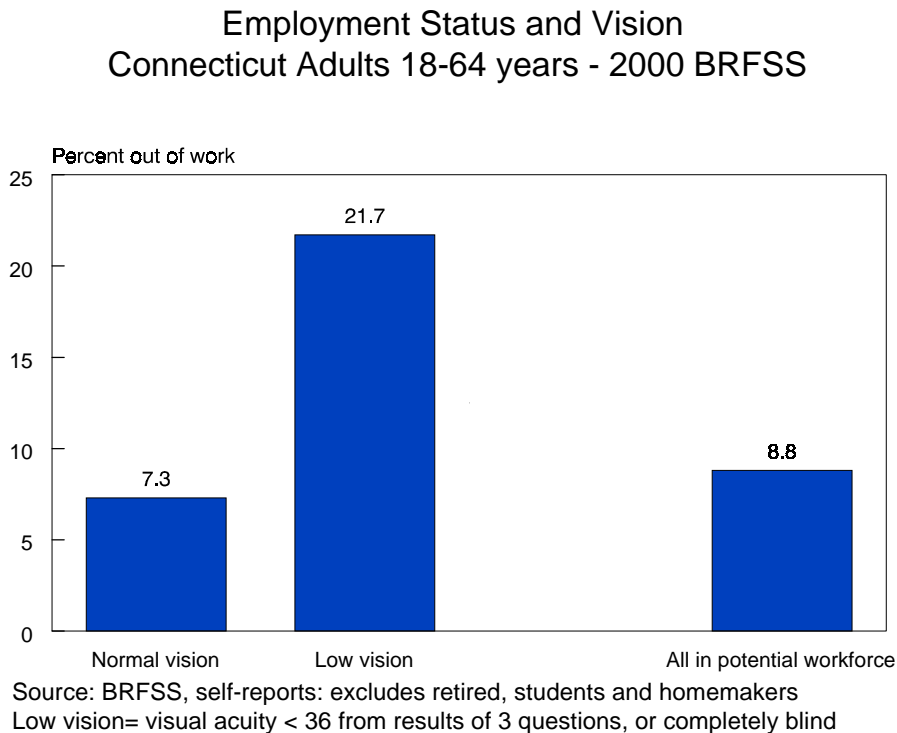
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### Potential Economic Effects

Low vision was found to be associated with additional factors that could have direct economic implications. For example, low vision was clearly associated with employment status, as shown in Figure 13. For the data dealing with employment, analysis was limited to the “potential workforce”, which excluded respondents over age 64, students, homemakers and all retired persons. While some retired persons may have retired for health or vision reasons, there was no way to distinguish the reason for retirement. The number of retired persons in the 18-64 year old age group was relatively small and did not seem to affect the results. There were 2,842 respondents in the potential workforce, with 9.5% classed as having “low vision”, and 14.5% self-reporting “poor vision”.

Persons were considered to be “out of work” if they answered that they were out of work less than one year, out of work more than one year, or were unable to work. Those employed for wages or self-employed were considered to be employed, even though it might be only part time. Compared with persons in the potential workforce with normal vision, those with low vision were about three times as likely to be out of work or unable to work (Figure 13). Taking into account that 9.5% of the potential workforce reported low vision, this represents approximately 40,000 potential workers with low vision that were out of work in Connecticut.

Figure 13.



While adults of any race were more likely to be out of work if they had low vision, Blacks and Hispanics were especially affected. Blacks and Hispanics were more likely to have low vision (as shown in Figures 2 & 3), and were also more likely to be out of work. Among

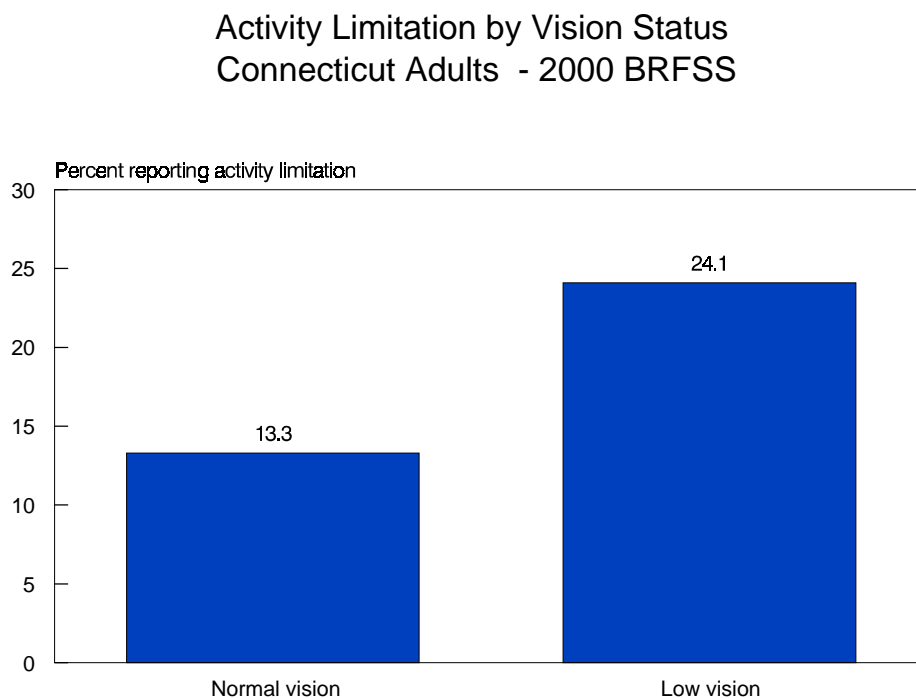


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non-Hispanic whites, 7% were out of work, while 17% of Blacks and 15% of Hispanics reported being out of work. Overall, 22% of the potential workforce 18-64 years of age were non-White, while 59% of the out of work persons with low vision were non-White. Among the potential workforce with low vision, over 25% of Blacks and Hispanics were out of work, compared with 16% of non-Hispanic Whites (because numbers were small, minority groups were combined).

Another area with potential direct economic impact is activity limitation due to any impairment or health problem. All persons were asked about physical, mental, or emotional problems or limitations they might have in their daily life that limited them in any way, in any activities. Such activity limitation was reported by 572 respondents, representing 14.5% of all Connecticut adults. Compared to persons with normal vision, those with low vision were much more likely to report a health impairment that limited activity (Figure 14). Examined another way, those with a limitation were about twice as likely to report low vision (18.3% vs. 9.8% for those without limitation). Although the numbers were small for the 18-44 year old age group, the results were similar for both age groups, suggesting that the result was not due solely to the fact that older persons were more likely to report both low vision and activity limitations. Only 3.6% of persons reported that a vision problem was the *major* health problem that limited their activities. Among those who reported activity limitations, persons with low vision were about twice as likely as those with normal vision to require help with personal or routine care needs (Figure 15). Personal care includes help eating, bathing, dressing, or getting around the house, while routine care includes help with household chores, doing necessary business, shopping, or getting around for other purposes.

Figure 14.

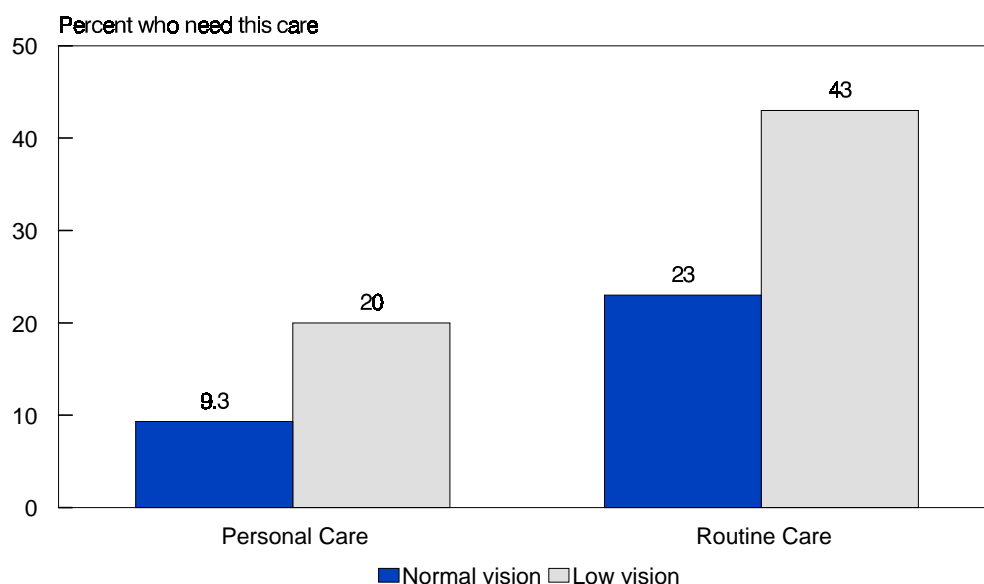


Source: BRFSS, self-reports.

Low vision = visual acuity <36 from results of 3 questions, or completely blind

Figure 15.

### Vision Status by Care Needs CT Adults with Activity Limitation - 2000 BRFSS



Source: BRFSS, self-reports; total n about 600.

Low vision = visual acuity <36 from results of 3 questions, or completely blind

## Discussion

Results for the two measures of low vision used in this survey were similar but offered some interesting contrasts. Some people who self-reported fair, poor or very poor vision had visual acuity well above 36, while some who reported excellent vision had estimated acuity values below 36. For example, about one third of those who reported fair or poor vision, had a visual acuity greater than 50, while one fifth of those who had an estimated acuity less than 20 reported excellent vision. (Since there were relatively few persons with fair or poor vision or acuity less than 20, these figures represented a small percentage of the total responses.) This apparent anomaly could be explained if persons were using different standards for self-reporting their vision. Since the questions addressed corrected vision, and no standard was provided (or even exists), it is quite likely that inconsistency would result. Inconsistent reporting could be even more likely among persons who never had a thorough eye exam to provide a standard for comparison.

The National Eye Institute has estimated that 5% of Americans have “low vision”, defined as uncorrected visual impairment which interferes with the ability to perform everyday activities.<sup>3</sup> They also note that low vision primarily affects those aged 65 and older. Among seniors, loss of vision has been associated with negative consequences, including loss of general functional status and wellbeing, and reduced social interactions<sup>4</sup>. One of the more significant findings in this current survey was that the effects of low vision were seen even among younger adults. The prevalence of low vision appeared to increase abruptly at age 45 and exist as two distinct rates; an average of 7.5% for those aged 18-44 years and 15% for

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those 45 and older. Thus these results are in contrast to the 5% overall National Eye Institute estimate, and their prediction of an increase in the prevalence of low vision at 65 years.

Other studies have noted higher rates of visual impairment among Hispanics (especially Puerto Ricans) and Blacks, although they do not appear to be quite as dramatic as results reported here.<sup>3,5</sup> In comparison with other racial/ethnic differences, the results reported here were also greater than most other racial/ethnic differences seen in BRFSS results. For example, differences between minorities and Whites are usually two- to three-fold, at the most, for such measures as obesity, health status, or lack of health insurance. The disparities between Whites and Hispanics for these vision measures exceeded other frequently mentioned racial/ethnic disparities. (Sexually transmitted disease and homicide rates are exceptions, where disparities run much higher). The difference in receipt of eye exams between Whites and Hispanics was especially striking, representing a 14-fold difference.

The results comparing low vision with SES were consistent with the results for age and race/ethnicity. Lower income adults, especially those that live in the major cities (as represented by ERG I) were more likely to have low vision. Blacks and Hispanics are likely to be heavily represented among low income and urban populations. These results do not indicate whether cultural issues were involved, but suggest some potential follow-ups and interventions. Focus group discussions among Hispanic adults could help determine if there are any barriers that discourage them from either obtaining eye exams, or using glasses to improve their vision. Key sources of health care for Hispanics (such as Community Health Centers) could be alerted to see that all their patients receive vision exams and proper follow-up. Barriers can be addressed as they are identified.

One other action that is suggested by these results is the printing of medical information and health messages in larger print. Over 16% of all adults reported that at least some of the time their vision limited them in reading newsprint. This is an important fact to keep in mind whenever health promotion literature is being printed.

The prevalence of low vision among persons with diabetes was consistent with results from the original study that produced the formula for estimating visual acuity<sup>2</sup>. In that study, 24.8% of persons with diabetes had low vision, compared with 22.6% in this survey. No controls were used in the earlier study, but persons without diabetes would be expected to have lower rates of low vision, since diabetes is known to cause loss of visual acuity. The clear association between health status and low vision can only partially be explained by the contribution from persons with diabetes, who were likely to report poor health and low vision. That result does not necessarily mean that low vision causes poor health, but only that the two are associated. The association of vision with obesity and exercise may be inter-related since these two risk factors are often associated. These relationships between vision and health, and various risk factors, warrant further study.

This study does suffer from certain limitations. As a telephone survey, persons without telephones (estimated to be less than 3% of households) were not represented. While the validity of the method for estimating visual acuity was determined for persons with diabetes, the validity in the general population of all adults aged 18 and over was not tested. No information was available on the validity of question 1 for self-rating vision. Survey non-

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response was also an issue, as there was no way of knowing anything about persons who don't respond. As survey response rates worsen over time, this is an increasing concern.

Some possible economic effects of low vision were implied by these results, in terms of employment and health care issues. As the population ages, the prevalence of low vision can be expected to increase. Even with the widespread use of surgical and laser techniques, many vision problems will remain uncorrectable. Adults who can't see to read or watch TV, may become socially isolated and may have trouble with activities of daily living. Because vision affects so many aspects of people's lives, the potential impact of low vision is great. The costs to treat low vision, and to care for people whose vision is uncorrectable, may be high.

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## APPENDIX A: Survey Questions

Next I would like to ask some questions about your eyes.

1. At the present time, would you say your eyesight (with glasses or contact lenses if that is how you see best) is excellent, good, fair, poor or very poor or are you completely blind?

(411)

- |  |   |
|--|---|
| a. Excellent                                 | 1 |
| b. Good                                      | 2 |
| c. Fair                                      | 3 |
| d. Poor                                      | 4 |
| e. Very poor                                 | 5 |
| f. completely blind <b>Go to next module</b> | 6 |
| Don't know                                   | 7 |
| Refused                                      | 9 |

2. How long has it been since you last had a routine eye exam that included a vision screening and checking your eyes for health problems such as glaucoma?

(412)

- |  |   |
|--|---|
| a. Within the past year (1-12 months ago)  | 1 |
| b. Within the past 2 years (1-2 years ago) | 2 |
| c. Within the past 3 years (2-3 years ago) | 3 |
| d. Within the past 5 years (3-5 years ago) | 4 |
| e. 5 or more years ago                     | 5 |
| f. Never                                   | 6 |
| Don't know                                 | 7 |
| Refused                                    | 9 |

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3. With glasses or contacts if you usually wear them, how much of the time does your vision limit you in recognizing a friend across the room?

(413)

Would you say: **Please Read**

- |                             |   |
|-----------------------------|---|
| a. All of the time          | 1 |
| b. Most of the time         | 2 |
| c. Some of the time         | 3 |
| d. A little bit of the time | 4 |
| e. None of the time         | 5 |

**Do not  
read these  
responses**

- |                     |   |
|---------------------|---|
| Don't know/Not sure | 7 |
| Refused             | 9 |

4. With glasses or contacts if you usually wear them, how much of the time does your vision limit you in recognizing people or objects across the street?

(414)

Would you say: **Please Read**

- |                             |   |
|-----------------------------|---|
| a. All of the time          | 1 |
| b. Most of the time         | 2 |
| c. Some of the time         | 3 |
| d. A little bit of the time | 4 |
| e. None of the time         | 5 |

**Do not  
read these  
responses**

- |                     |   |
|---------------------|---|
| Don't know/Not sure | 7 |
| Refused             | 9 |

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5. With glasses or contacts if you usually wear them, how much of the time does your vision limit you in reading print in a newspaper, magazine, recipe, menu, or numbers on the telephone? (415)

Would you say: **Please Read**

- |                             |   |
|-----------------------------|---|
| a. All of the time          | 1 |
| b. Most of the time         | 2 |
| c. Some of the time         | 3 |
| d. A little bit of the time | 4 |
| e. None of the time         | 5 |

**Do not  
read these  
responses**

- |                     |   |
|---------------------|---|
| Don't know/Not sure | 7 |
| Refused             | 9 |

6. With glasses or contacts if you usually wear them, how much of the time does your vision limit you in watching television? (416)

Would you say: **Please Read**

- |                             |   |
|-----------------------------|---|
| a. All of the time          | 1 |
| b. Most of the time         | 2 |
| c. Some of the time         | 3 |
| d. A little bit of the time | 4 |
| e. None of the time         | 5 |

**Do not  
read these  
responses**

- |                     |   |
|---------------------|---|
| Don't know/Not sure | 7 |
| Refused             | 9 |

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7. Again, with glasses or contact lenses if you usually wear them, how much of the time does your vision limit you in reading the small print in a telephone book, on a medicine bottle, or on legal forms?

(417)

- |                             |   |
|-----------------------------|---|
| a. All of the time          | 1 |
| b. Most of the time         | 2 |
| c. Some of the time         | 3 |
| d. A little bit of the time | 4 |
| e. None of the time         | 5 |

**Do not  
read these  
responses**

- |                     |   |
|---------------------|---|
| Don't know/Not sure | 7 |
| Refused             | 9 |

8. How often are you limited in how long you can work or do other daily activities because of your vision?

(418)

- |                             |   |
|-----------------------------|---|
| a. All of the time          | 1 |
| b. Most of the time         | 2 |
| c. Some of the time         | 3 |
| d. A little bit of the time | 4 |
| e. None of the time         | 5 |

**Do not  
read these  
responses**

- |                     |   |
|---------------------|---|
| Don't know/Not sure | 7 |
| Refused             | 9 |



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9. How often do you use a magnifying glass to read or do other close work?

- |                             |                |
|-----------------------------|----------------|
| a. All of the time          | (419)<br>1     |
| b. Most of the time         | 2              |
| c. Some of the time         | 3              |
| d. A little bit of the time | 4              |
| e. None of the time         | <b>or</b><br>5 |
| Don't know/Not sure         | 7              |
| Refused                     | 9              |

**Do not  
read these  
responses**

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### **APPENDIX B.**

#### Formula for Estimating Visual Acuity

Responses to the 3 questions (#4 - #6) were coded as 1 (all the time) through 5 (none of the time), as indicated in the questions. About 100 respondents did not answer all three questions and were excluded. The scores for each question (Q) were substituted into the formula below:

$$\text{Acuity} = 1.8 + 3.0 \times (\text{street Q score}) + 4.5 \times (\text{news Q score}) + 2.6 \times (\text{TV Q score})$$

Thus the measure of acuity ranged from 11.9, for persons who answered “all the time” to each question, to 52.3 for those who answered “none of the time” to each question. Over two thirds of respondents had an estimated acuity of 52.3. The acuity estimate represents the number of letters the person could read on a LogMar eye chart. Persons who said they were completely blind were assigned an acuity value of 0.

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## APPENDIX C. Selected Results 2000 BRFSS All adults 18 and older

	Un-weighted n	Prevalence rates		
		Low* vision	Poor ** vision	Never had eye exam
Total	3,805	11.0%	15.8%	4.4%
Men	1,486	10.0%	14.9%	5.1%
Women	2,319	11.9%	16.7%	3.7%
Age 18-49	2,309	8.2%	12.5%	5.9%
50-64 yrs	811	14.9%	17.3%	3.0%
65+ yrs	631	16.4%	24.2%	1.0%
Whites	3,050	8.0%	14.0%	1.7%
Blacks	235	15.5%	23.2%	3.0%
Hispanics	347	31.7%	24.7%	23.9%
income <\$25K	644	14.9%	25.5%	7.0%
\$25-75K	1,529	8.8%	15.1%	2.8%
>\$75K	960	4.6%	8.1%	0.9%
People with diabetes	207	22.6%	31.8%	1.0%
Without diabetes	3,592	10.3%	14.9%	4.5%
Health v. good or exc.	2,297	7.6%	9.2%	3.4%
Good health	1,013	12.4%	18.3%	4.4%
Fair/poor health	489	23.1%	38.8%	8.7%
Any exercise	2,873	9.2%	13.7%	3.9%
No exercise	931	16.5%	22.3%	5.8%
Insured	3,609	11.2%	15.8%	4.1%
Not insured	196	7.7%	16.0%	8.8%
ERG A/B	731	7.0%	13.9%	2.3%
C/D	863	8.3%	12.9%	3.5%
E/F	640	8.1%	13.0%	2.3%
G/H	840	11.4%	17.6%	5.3%
I	731	20.2%	21.6%	8.4%

(ERG is a grouping of towns by SES, with A having highest SES (Avon, Westport, etc.) and I having lowest SES (Hartford, New Haven, Windham, etc.; See Table 1.)

\*Low vision = visual acuity < 36 from results of 3 questions, or completely blind

\*\* Poor vision = self-reported fair, poor, or very poor vision, or completely blind

unweighted n is for "low vision" measure; n's were slightly larger for "poor vision" measure